Socio-Economic Impacts of Mobile/Wireless Technologies:
Strategist and Policies

GENUINE:
The Mobile Internet Service

Masataka Ohta

Lecturer, Tokyo Institute of Technology

CTO, Mobile Internet Services, Inc.

mohta@necom830.hpcl.titech.ac.jp

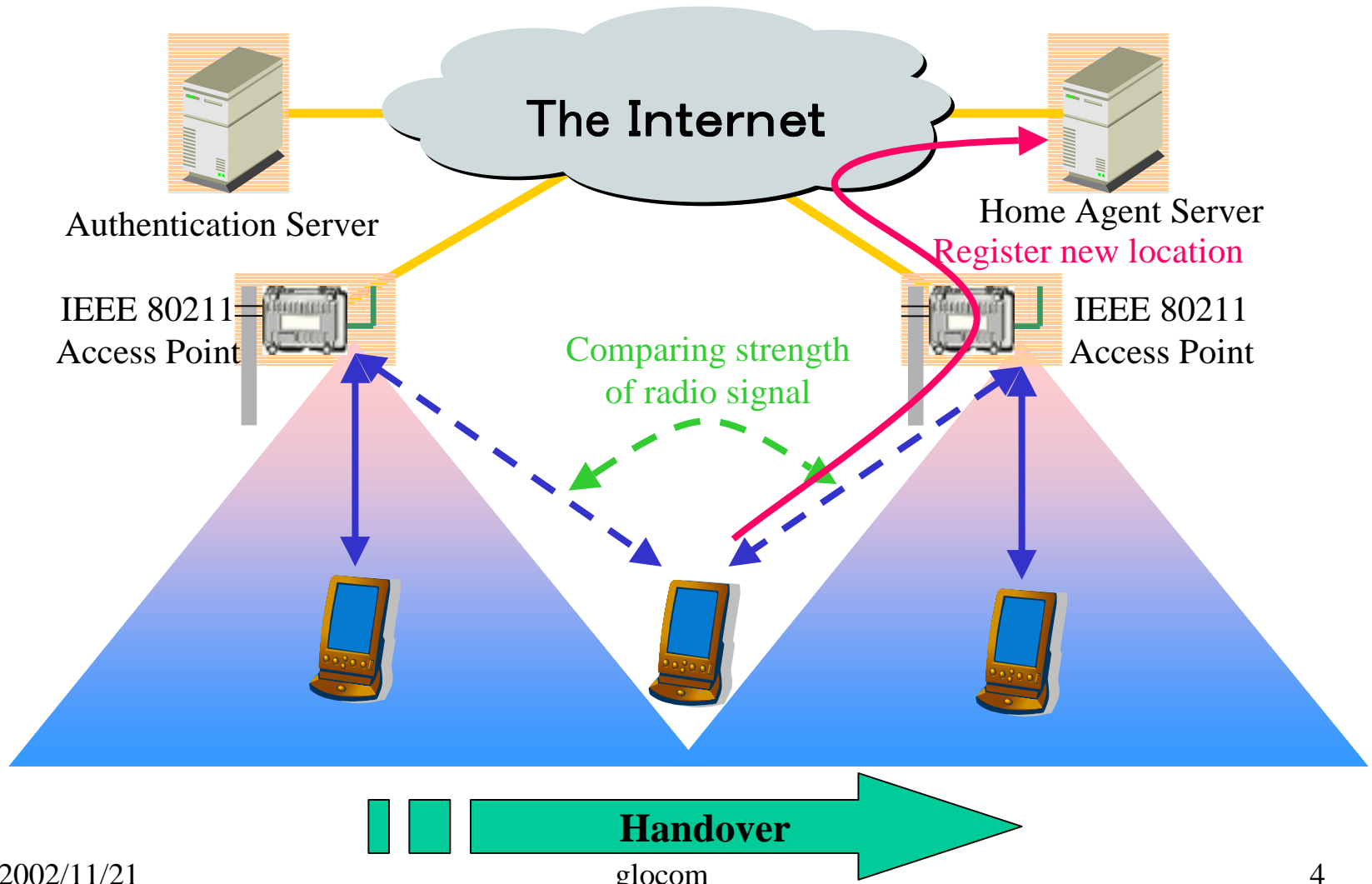# The Next Generation Information Infrastructure

- Purely Internet!
  - Not merely private IP-based network
- Purely Optical!
  - Optical fibers are so fast and inexpensive
- However, people or cars can not move around with optical fibers attached!
  - Optical fiber can not replace radio waves for the **mobile** Internet environment
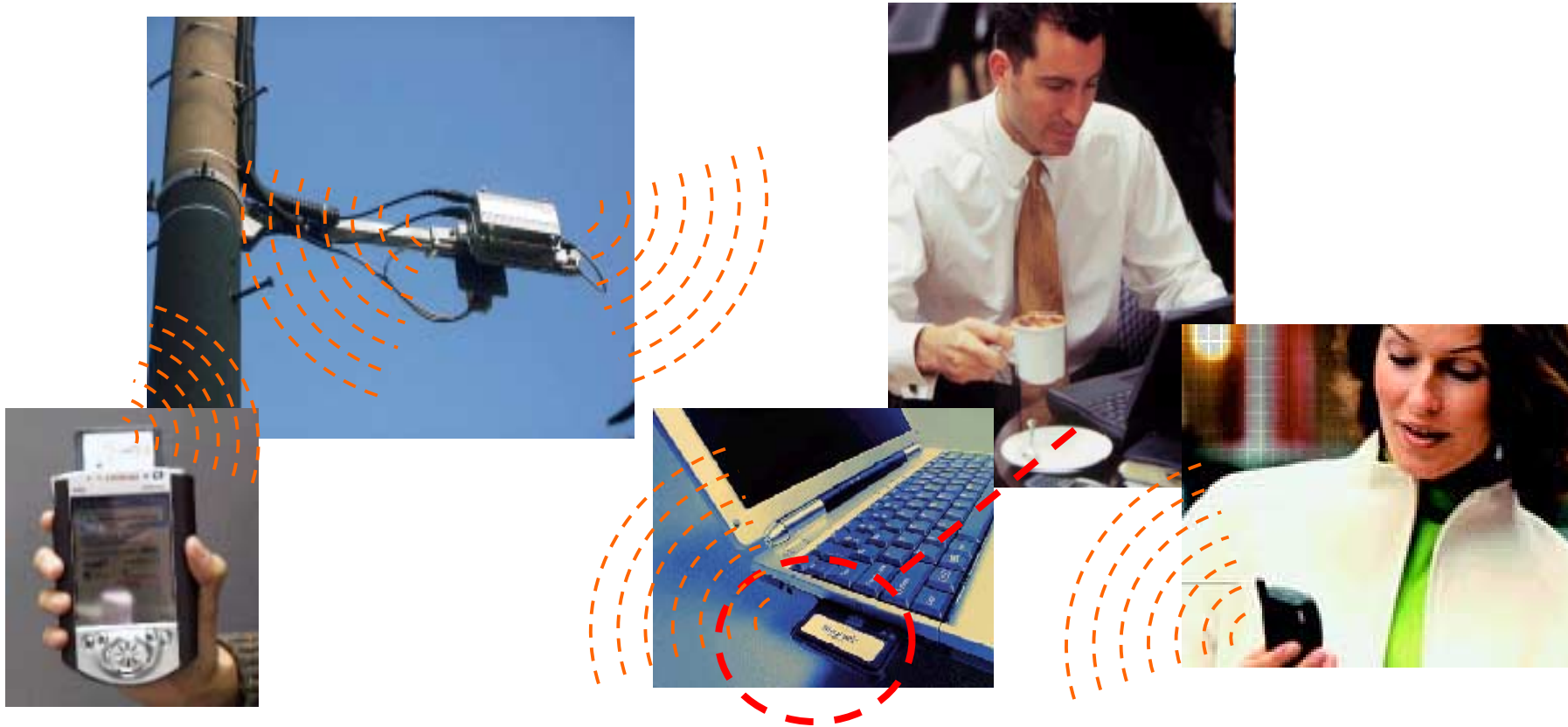
MIS: Who Are We? (Mobile Internet Services, Inc.)

- A Japanese Company Est. in Apr. 2001

- Licensed as a Class 1 Carrier in July 2001

- Start Commercial Mobile Internet Service with Wireless LAN in Apr. 2002

- About 250 Base Stations are Installed around Tokyo

- http://www.miserv.net

Seamless Mobile Communication

The Internet

Authentication Server

Home Agent Server
Register new location

IEEE 80211
Access Point

IEEE 80211
Access Point

Comparing strength
of radio signal

Handover

2002/11/21

glocom

4

Service Image

Users can access the service with their current handy devices.

Image of Business Development

User Interface

Laptop PC＋Wireless LAN card

User Interface

PDA to support wireless LAN

User Interface

Mobile phones, Camera, Mp3 etc

Service area

Hot spots including cafes、restaurants、airports、hotel lobbies etc.

Service area

Stop-off points, for example,at intersections, railroad stations and vending machines.

Service area

To support users in transit as possible.

Business Scheme

The Internet

Carrier ISP

Access Point
Optical Fiber Network

Access Point
xDSL Network

Authentication server

Carrier ISP

MIS

Users

Career ISP

Network Fee

Provide Internet Backbone Connection Service .

●Global IP address

MIS

Provide Mobile Internet services.

Access Fee

●ID / Password

●Terminal Software

Users
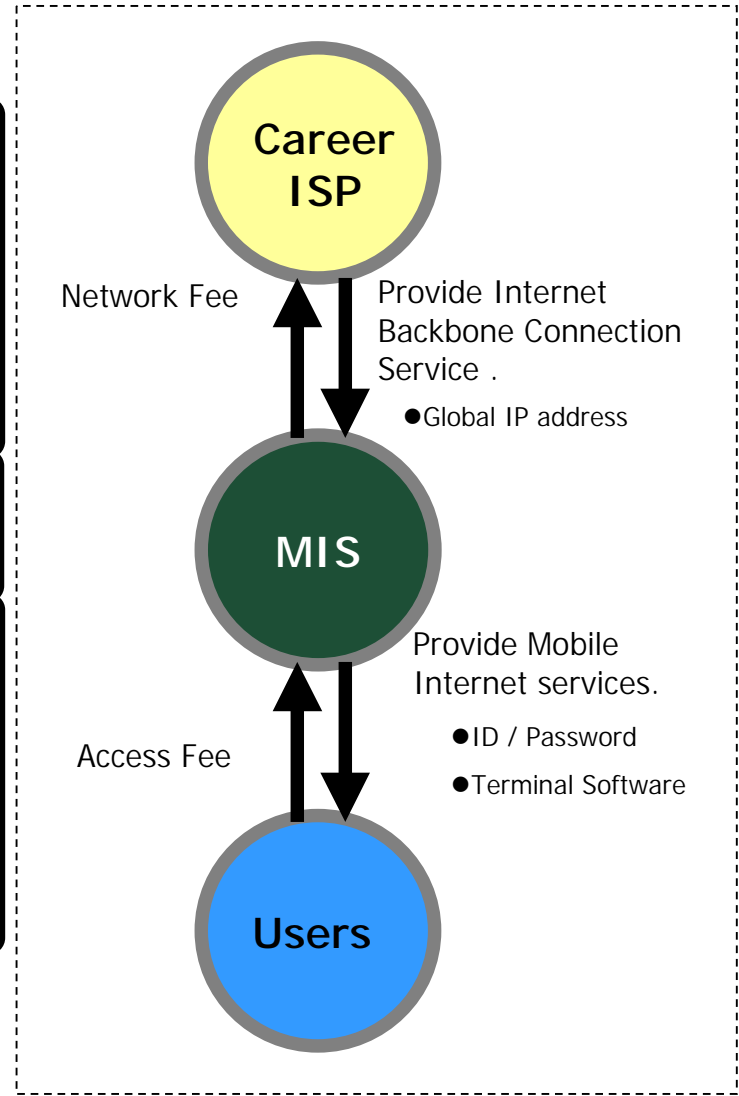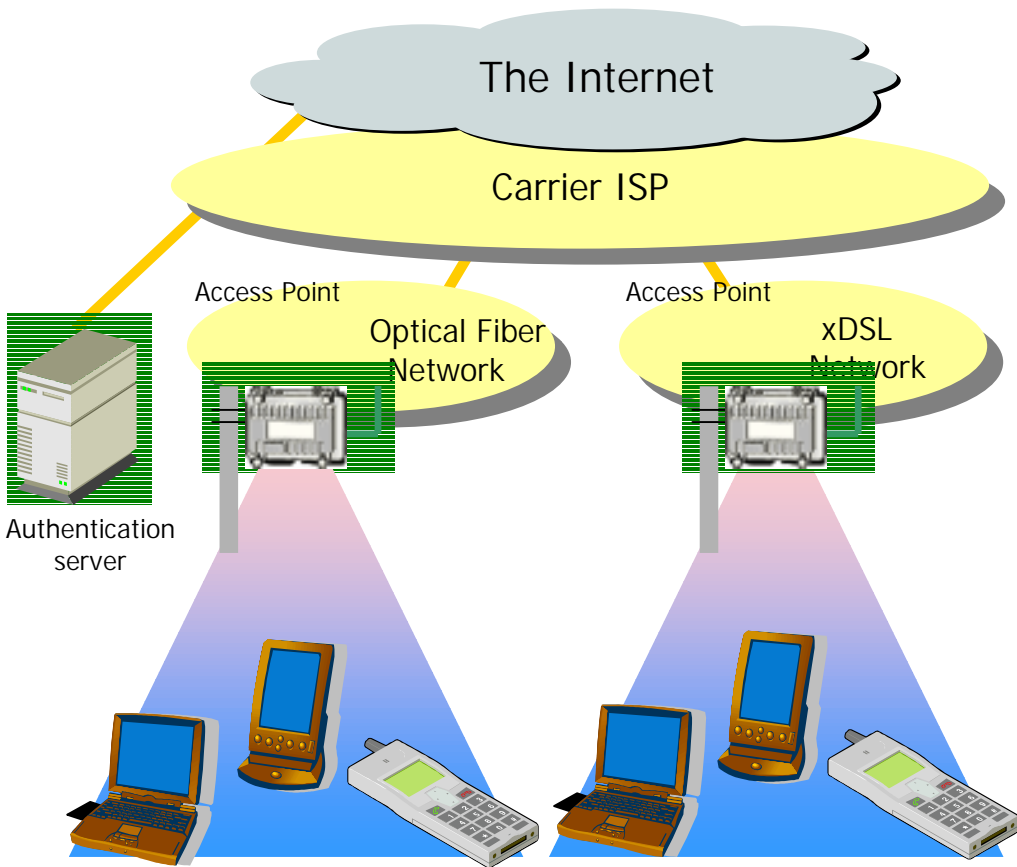
Advantages & Differentiation

Advantage over iMode and WAP : IP Connection & Fixed Amount System

iMode and WAP
- Terminals are identified by telephone company's identifier.
- Virtual line＋packet exchange
  →Per-unit charge system is necessary.
- Internet connection via gateway
  →Only Web and e-mail are available.(Applications are specified.
  →Gateway is a bottleneck of speed.
  →Low durability

MIS
- Terminals are identified by global IP addresses.
- Connection-less-packet exchange
  →Flat rate charge system is realized
- Seamless connection to Internet
  →Any types of applications are available.
  →High durability

Differentiation from other services

	IMT2000		PIAFS		Mobile Internet Service
	WCDMA	CDMA2000	P-in	H″	MIS
Vender／career	NTTDoCoMo ERICSSON	Qualcomm	NTTDoCoMo	KDDI	MIS
Speed	Stationary state : 2Mbps High-speed movement：144kbps Walking speed : 384kbps		64kbps 128kbps		11Mbps
Base technology	Based on current telephone network		Based on current telephone network		Internet
Charges	Per-unit charge		Per-unit charge		Fixed charge

Wireless Network (Hot Spot Services)

!=

Mobile Internet

What is the "Mobile" "Internet" Service?

- Mobile
  - Portable Terminals
  - Connected to the Network Anytime Anywhere
- The Internet
  - The World Largest Public IP Network
  - Not Merely a Private IP Network
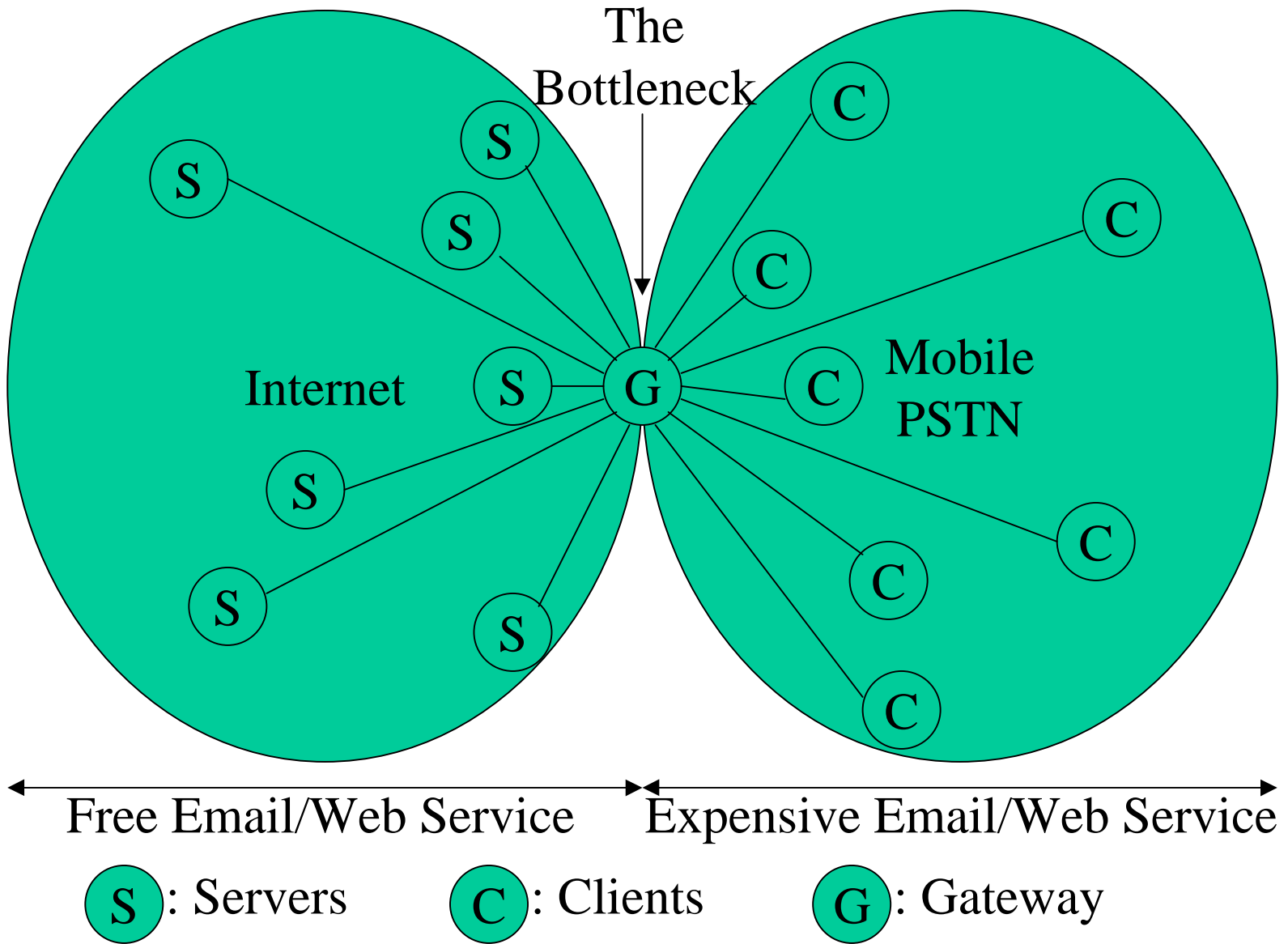 - Not an Application such as Email or Web

What is the Internet?

- Not Email
  - Common Misunderstanding Several Years Ago
- Not Web
  - Common Misunderstanding Today
- The Internet is the Worldwide Public Information Infrastructure Interconnecting Computers Directly with IP
  - Not Merely an IP Network
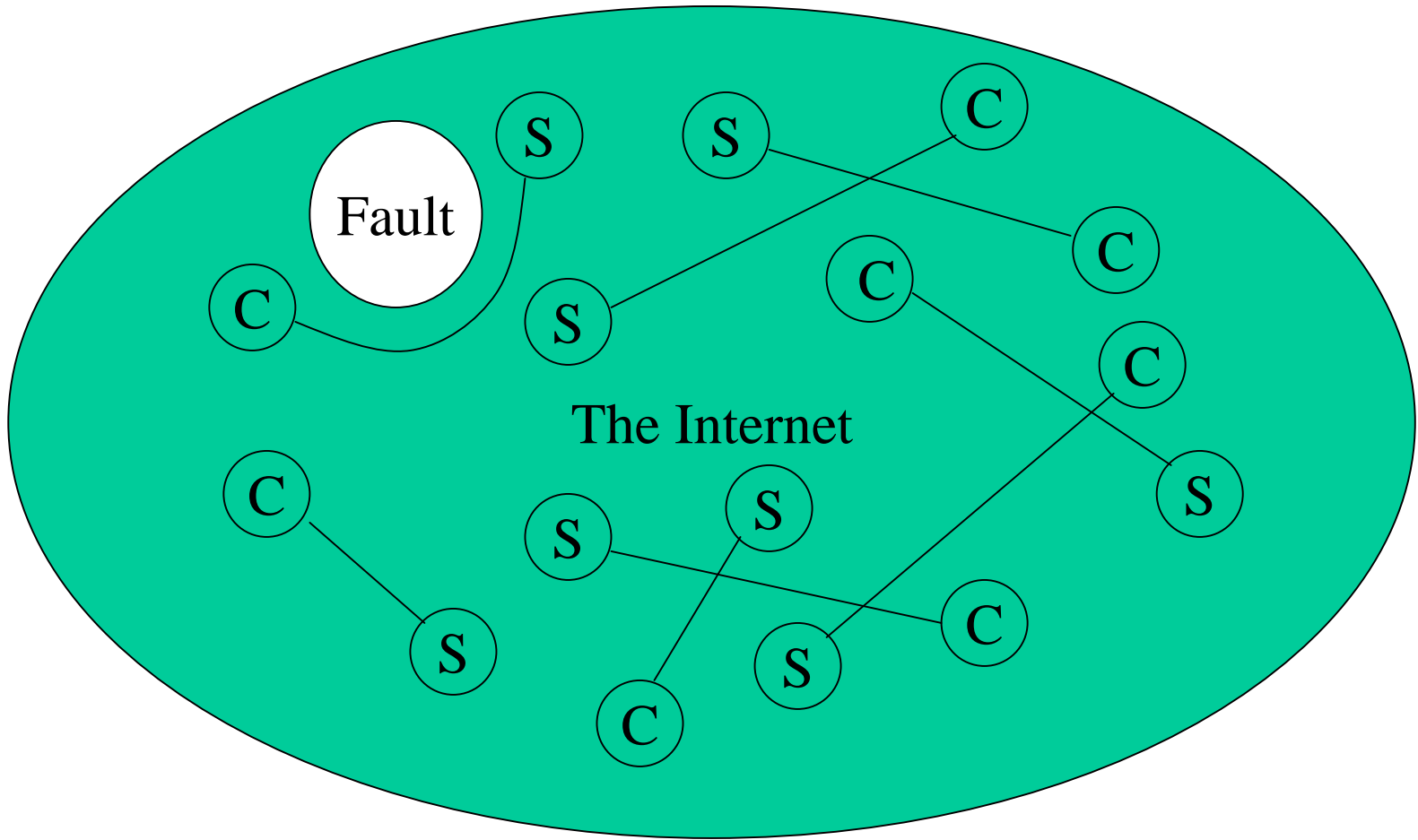
An Example of Non-Internet: Email

- UUCP Network was not the Internet
- Email is an Application Available on the Internet
  - Also Available on other Networks (e.g. PSTN)
- In Japan, Foreign Email over UUCP Network was not Free
  - Email over Mobile PSTN is not Free

An Example of Non-Internet: Web

- Web is an Application Available on the Internet
  - Also Available on other Networks (e.g. PSTN)
  - Web over Mobile PSTN is not Free
- Microsoft is actively Causing the Confusion

The Bottleneck

Internet

Mobile PSTN

S S S S S S S S

C C C C C C C C

G

← Free Email/Web Service | Expensive Email/Web Service →

S : Servers   C : Clients   G : Gateway

Using the Internet Servers from Mobile PSTN

Free Email/Web/Telephone Service

S : Servers   **C** : Clients

Using the Internet Servers from the Internet

An Example of Non-PSTN: Telephony

- Telephony is not a Telephone Network
- Telephony is an Application Available on PSTN
  - Also Available on other Networks (e.g. the Internet)
- Telephony over the Internet is Free
  - A Killer Application for the (Mobile) Internet
  - Telephony over IP-based PSTN is not Free

An Example of Non-Internet: Dial-up

- Dial-up Technology
  - Access the Internet Indirectly Through Legacy Infrastructure (such as PSTN)
  - Not Really Applicable to DSL or WLAN
  - No Persistent Connectivity to the Internet
- Without the Persistent Connectivity
  - Can not Source Information
    - No Server Operation such as Receiving Telephony

What is Mobility

- Connected to the Network Anytime Anywhere
  - Scale of the Area is Essential
  - No Connection Operations are Required on Movement
    - Automatic handover is essential
- Immobile Service Should be Covered by Optical Fibers

An Example of Immobility: Notebook Computer

- Heavy, Bulky
- Operation while Walking Impossible
- Battery does not Last So Much
  - Wireless Connectivity with Wired Power?
- PDA is Acceptable
  - for Limited Application such as Email or Web
- Digital Camera, Music Player etc. are Better

An Example of Immobility: Hotspot Service

- Wireless != Mobile
  - Wireless Physically Enables Movement within a Area of a Base Station
  - Infrastructure Mode of WLAN Enables Movement between Tens of Base Stations
    - No global movement, yet

- Hotspot Service is Nothing More Than a Public Phone or Cordless Phone
  - Dial-up Service with Login Required

Hot Spot Service

Mobility

Mobility

Mobility

Mobility

Mobility

Mobility
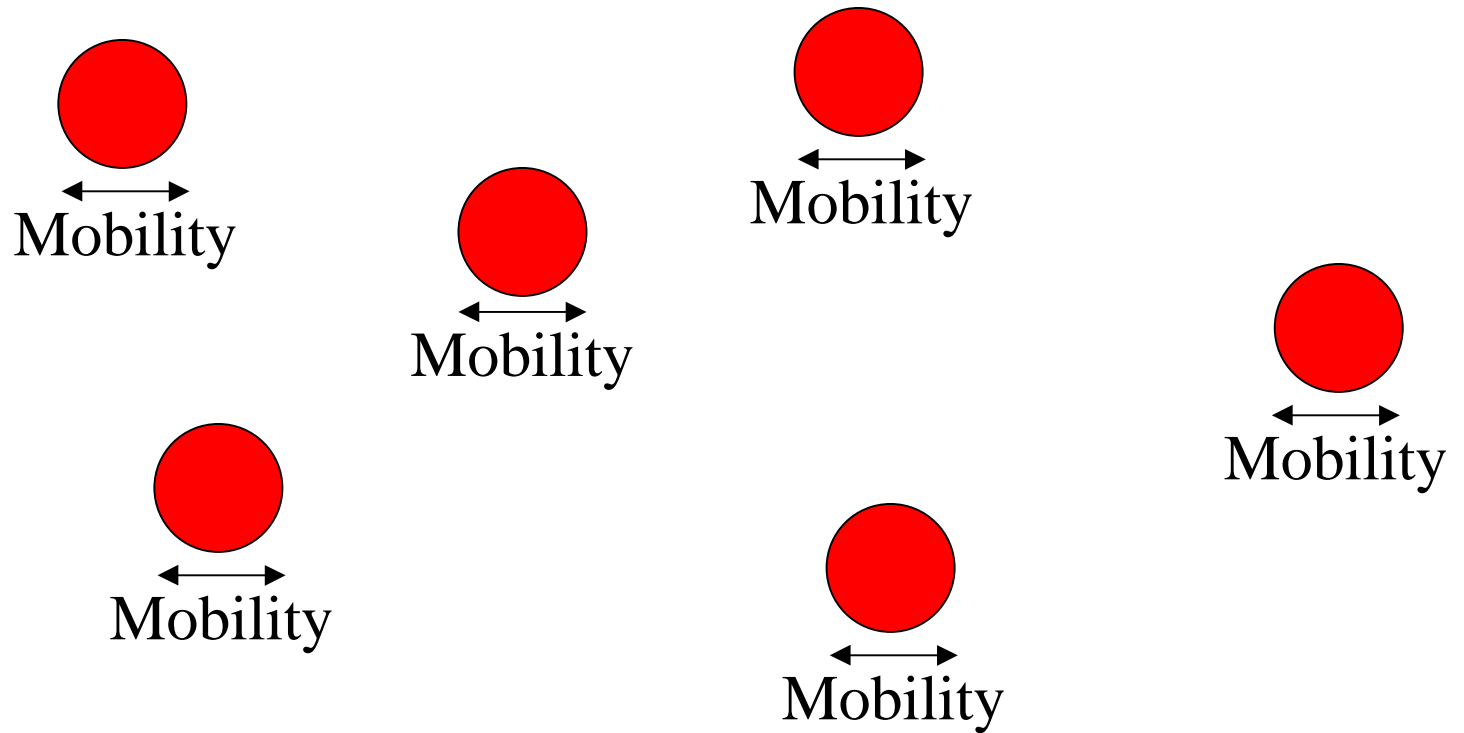
What is Hotspot Service?

- Conceived by Roaming Operators?
  - Roaming: a Legacy Technology of Dial-up Era
  - Disappear as Persistent Connectivity Prevails
- Basically a Dial-up Technology
  - Access the Internet **Indirectly** Through **Legacy** Infrastructure (such as PSTN)
    - RAS is a unreliable speed bottleneck to PSTN
   - Not Really Applicable to DSL or WLAN
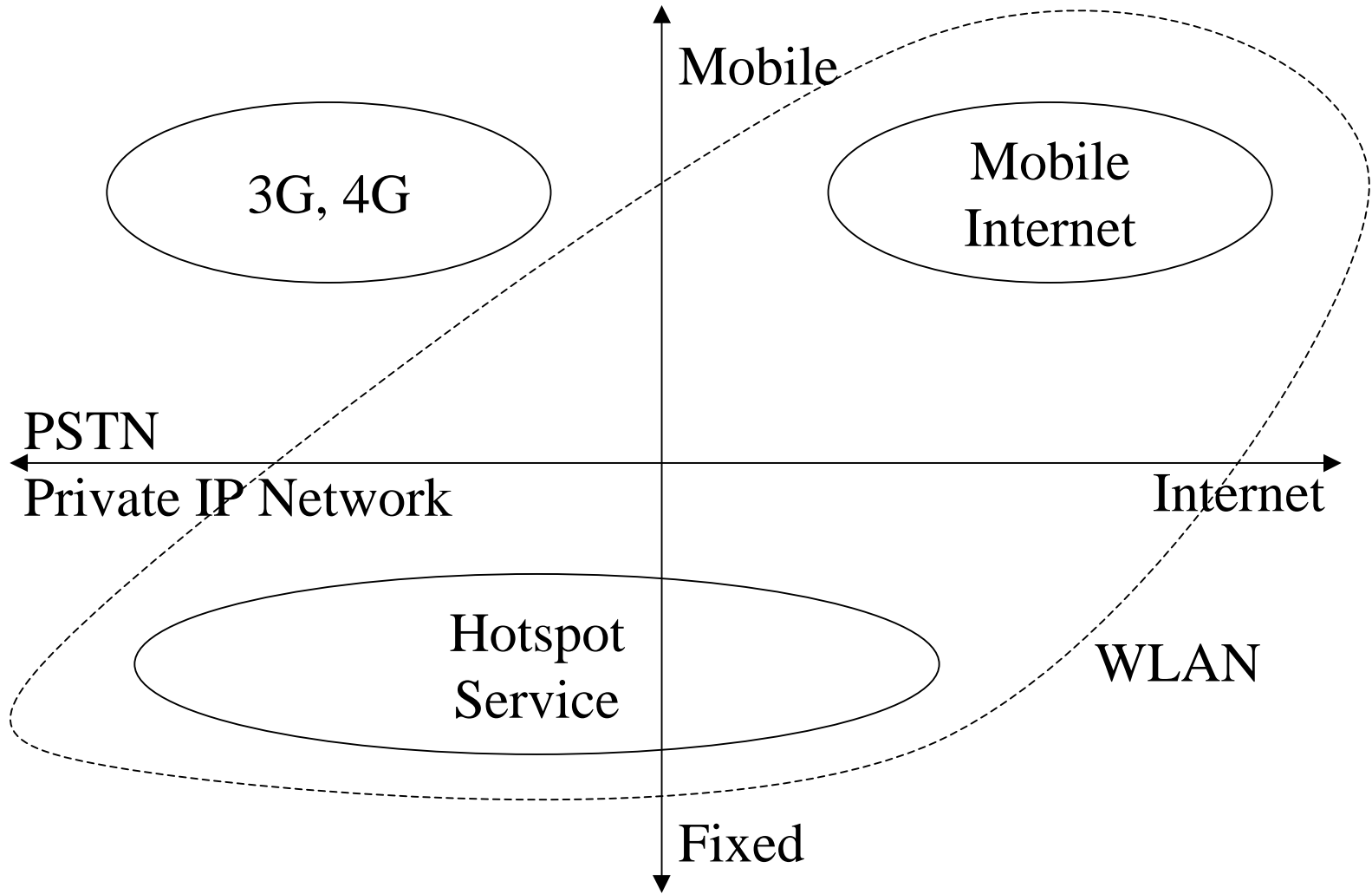
Hotspot Service is Hopeless: No Migration to Mobile Service

- Roaming between Operators in Small Area?
  - Roaming Assume Charging on Connection Duration
    - Good for dial-up service
    - Not applicable to the persistent connectivity
      - Can't charge people just pass-by a base station

- More Stations Does not Mean Mobility
  - 802.1x is too slow for fast handover

To Enable the Mobile Internet Service

- Densely Populate Inexpensive Base Stations Persistently Connected to the Broadband Flat-rated Fixed Internet Enables
  - Inexpensive Broadband Flat-rated Wireless Internet
  - IP Mobility Makes it The Mobile Internet
- Security is the Major Concern
  - WEP, IEEE 802.1x, IEEE 802.11i are useless

Mobile Internet Service

Mobile
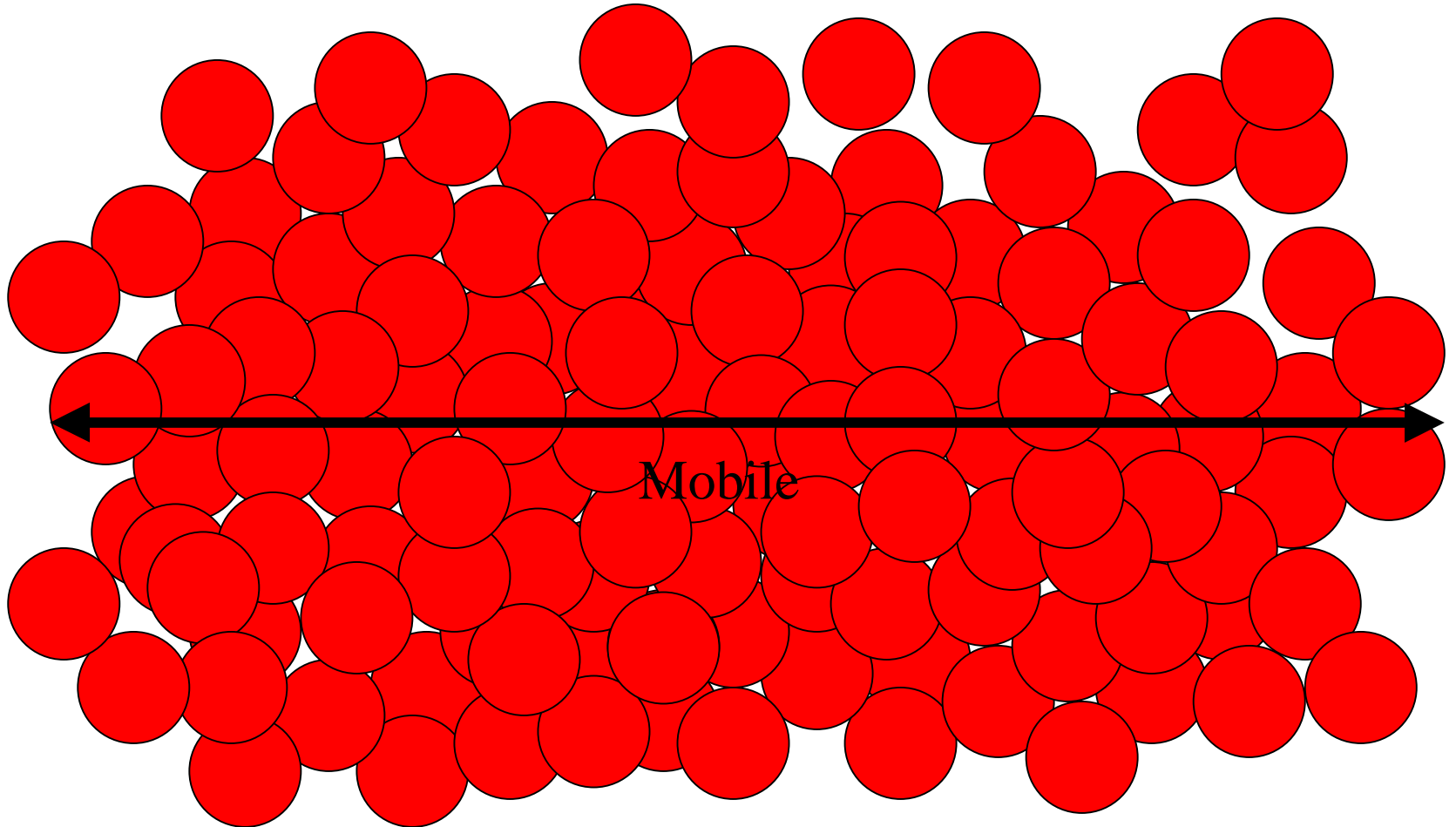
MIS Service Area in Tokyo

Stations of JR Yamanote line and subways
Major 5 wards
（Chuo, Chiyoda, Shinjuku, Shibuya, Minato）
Downtown・Business District（Small Flame）
Downtown・Business District（Large Flame）
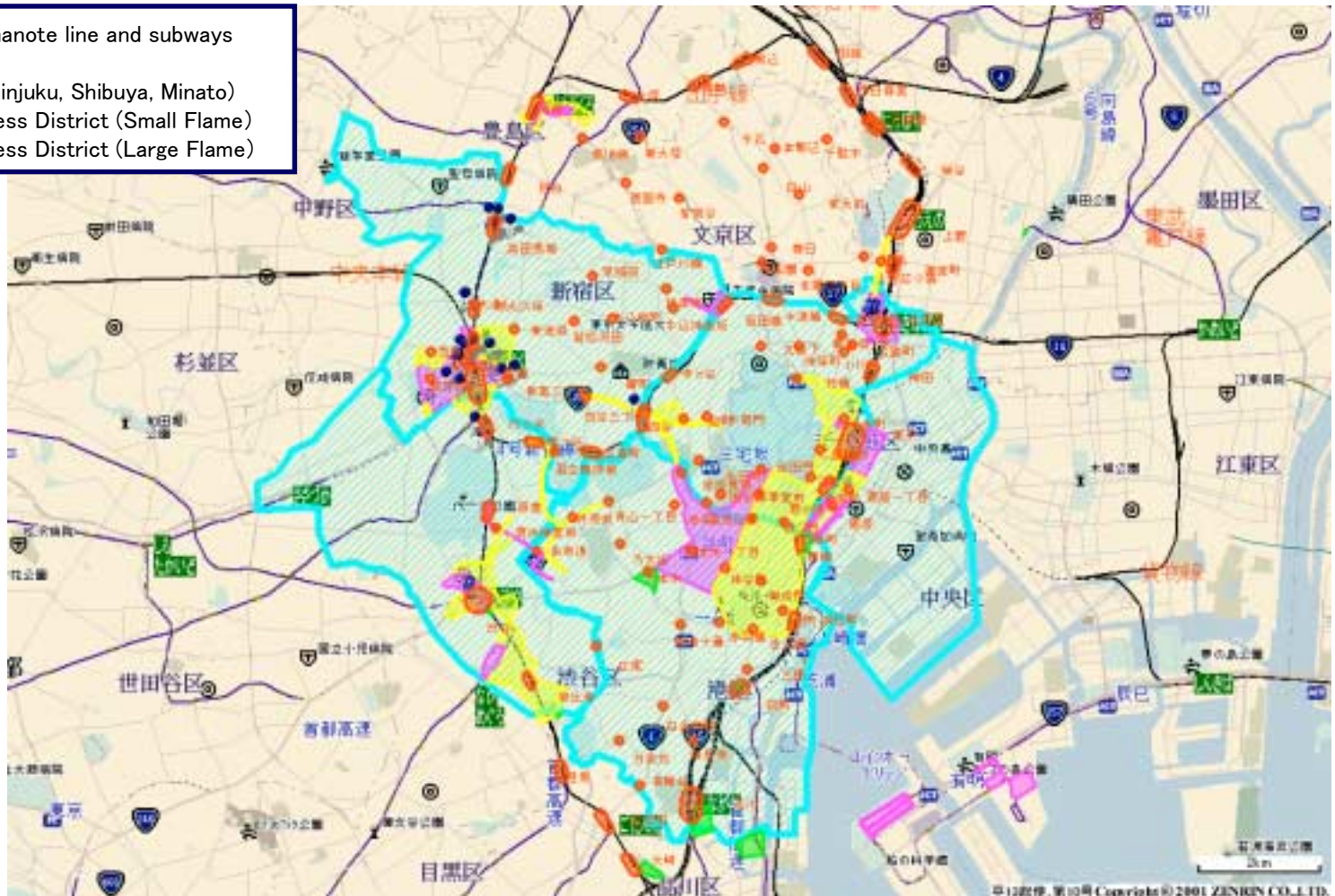
Expanding the Area (1) Community Partner

- Local Community Installs Wireless Equipment and Mobile Servers

- Local Community Provide Upstream Internet Connectivity

- MIS Licenses Mobile & Security Technology

- MIS Customers are Allowed to use the Local Equipment

MIAKO NET

- The Largest Community Partner
  - 150> Base Stations in Kyoto Prefecture
- Operated by Local NPO: SCCJ & ASTEM
- Free Service to Residents and Visitors
  - Equipment are Originally Funded by TAO for IPv6 Promotion Project
  - Local People Donate Internet Connectivity
- http://www.miako.net
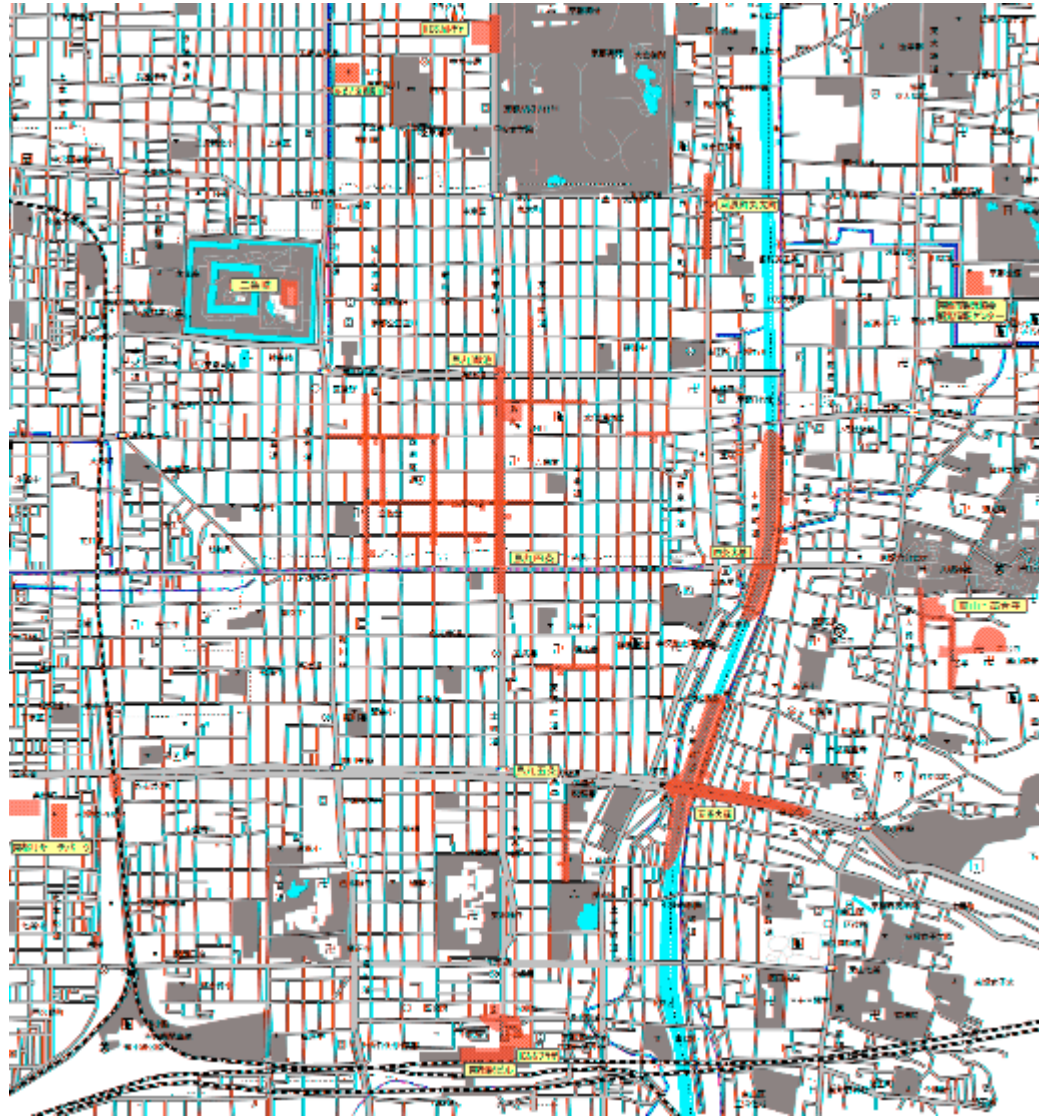
Service Area of MIAKO NET at Central Kyoto City

Expanding the Area (2)
Rely on Legal Privilege

- Licensed Class 1 Carriers have Privilege
  - to forcibly install equipment and conduit upon permission of the Minister of PHPT (Public Managent, a Home Affairs
    - Telecommunication Business Act: Clause 73
  - Essential Privilege for Continuous Coverage of MIS
    - Wireless LAN Service Area is Small
      - about 100m of Radius

Railway Stations of JR East (Tokyo, Shinjuku, Shinagawa, …)

- Important Publicly Accessible Areas
  - Essential to be Included in MIS Service Area
- JR East Runs Experimental HOTSPOT Service by Themselves
  - Does not Allow Others Put Base Stations
  - Historically, JR East Allowed PHS Base Stations only of its Family Carrier
- Permission from MPHPT was Requested

Response from MPHPT

- Judgement by the Minister 4 Months Later
  - The Request Satisfies all the Conditions of the Guideline
- Judgement by the Coordination Committee on Telecommunication Business Disputes
  - Outside an Intended Scope of a Corresponding Clause of Now-Obsolete Law: Public Telecommunication Act (1953)
- Permission Denied. Law Modification?

Problem of the Judgement

- Against the Guideline
  - Discretionary Administration is Unpredictable and Prohibits Private Sector Activities
- Unjust Reasoning Insisting on Private Right
  - Obsolete Law of 49 Years Ago?
    - PHS (older one), WLAN and 4G are not deployable
  - Other Document of the Committee States
    - similar clause was inherited in obsolete act (1953) but new one was created in the current act (1984)

Conclusions

- GENUINE of MIS is the Mobile Internet Service

- Area Coverage is Essential to Mobile Service

- Discretional Administration Private Sector Activities